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**Continued to the last page**

(54) [Title of the invention]  
ICON DISPLAY CONTROL  
METHOD, DEVICE THEREOF,  
OUTPUT SYSTEM HAVING  
5 THE DEVICE AND  
RECORDING MEDIUM FOR  
RECORDING STEPS OF THE  
METHOD

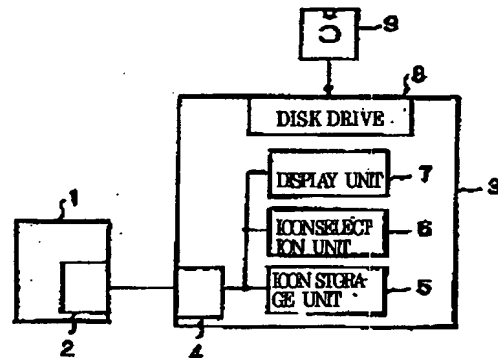
(57) Abstract

10 [Problem] To provide an icon  
display control method for  
enabling confirmation of a  
status of an output device by  
icon display on a computer  
15 instrument disposed separately  
from the output device, a device  
thereof and an output system  
having the device.

[Means for Solving the Problem]

20 Upon receiving status  
information indicating a printer  
status from a color printer 1,  
determinations are made as to  
whether or not the color printer  
25 1 is in online status, whether or  
not color toner is present, and

whether or not a recording  
paper used is for color. An icon  
selection unit 6 then reads icon  
data corresponding to the status  
from an icon storage unit 5,  
allowing a display unit 7 to  
display the icon data.



[Scope of claims]

[Claim 1]

An icon display control device for displaying, by using an icon,  
a status of an output device connected through a line, the icon display  
control device characterized by comprising:

acquiring means for acquiring status information of the output  
device;

storing means for storing a plurality of pieces of icon  
information;

selection means for selecting corresponding icon information  
from a plurality of pieces of icon information stored in the storing  
means, on the basis of the status information acquired by the acquiring  
means; and

display means for displaying an icon on the basis of icon  
information selected by the selection means.

[Claim 2]

An icon display control device for displaying, by using an icon,  
a status of an output device connected through a line, the icon display  
control device characterized by comprising:

acquiring means for acquiring status information of the output  
device;

storing means for storing a plurality of pieces of icon  
information;

changing means for changing a display form of icon  
information stored in the storing means, on the basis of the status  
information acquired by the acquiring means; and

display means for displaying an icon on the basis of icon information of which display form is changed by the changing means.

[Claim 3]

5 The icon display control device according to claim 1 or claim 2, wherein the output device is a color printer and the status information includes information indicating whether or not the color printer is capable of color printing.

[Claim 4]

10 The icon display control device according to claim 2, wherein the changing means changes the icon information so that the icon becomes monochrome or reversed.

[Claim 5]

15 The icon display control device according to claim 1 or claim 2, wherein the acquiring means acquires status information by means of transmission of the status information from the output device to the display control device, the transmission made when the status of the output device changes.

[Claim 6]

20 The icon display control device according to claim 1 or claim 2, wherein the acquiring means acquires status information which is outputted from the output device in response to a request signal, the request signal issued to the output device by a program executed in the display control device.

[Claim 7]

25 The icon display control device according to any one of claims 1 to 6, wherein the output device is connected through a network.

[Claim 8]

The icon display control device according to any one of claims 1 to 7, wherein the status information includes information indicating whether or not the output device is in online status.

5 [Claim 9]

The icon display control device according to any one of claims 1 to 7, wherein the status information includes information indicating whether or not the output device has run out of toner.

[Claim 10]

10 The icon display control device according to any one of claims 1 to 7, wherein the output device is a color recording device, and the status information includes information indicating whether or not the color recording device has a recording medium for color recording.

[Claim 11]

15 An icon display control method for displaying, by using a icon, a status of a output device connected through a line, the icon display control method characterized by comprising:

a acquiring step of acquiring status information of the output device;

20 a step of selecting corresponding icon information from a plurality of pieces of icon information stored in a memory, on the basis of the acquired status information; and

a step of displaying an icon on the basis of the selected icon information.

25 [Claim 12]

An icon display control method for displaying, by using a icon,

a status of a output device connected through a line, the icon display control method characterized by comprising:

a acquiring step of acquiring status information of the output device;

5 a step of changing a display form of icon information stored in a memory; and

a step of displaying an icon on the basis of icon information of which display form is changed.

[Claim 13]

10 The icon display control method according to claim 11 or claim 12, wherein the output device is a color printer, and the status information includes information indicating whether or not the color printer is capable of color printing.

[Claim 14]

15 The icon display control method according to claim 12, wherein the icon information is changed to so that the icon becomes monochrome or reversed.

[Claim 15]

20 The icon display control method according to claim 11 or claim 12, wherein, in the acquiring step, status information is acquired by means of transmission of the status information from the output device, the transmission made when the status of the output device changes.

[Claim 16]

25 The icon display control method according to claim 11 or claim 12, wherein, in the acquiring step, a request signal is issued to the output device, and thereby status information, which is outputted from

the output device in response to the request signal, is acquired.

[Claim 17]

The icon display control method according to any one of claims 11 to 16, wherein the output device is connected through a network.

5 [Claim 18]

The icon display control method according to any one of claims 11 to 17, wherein the status information contains information showing whether or not the output device is in the online status.

[Claim 19]

10 The icon display control method according to any one of claim 11 to 17, wherein the status information includes information indicating whether or not the output device has run out of toner.

[Claim 20]

15 The icon display control method according to any one of claims 11 to 17, wherein the output device is a color-recording device and the status information includes information indicating whether or not the color-recording device has a recording medium for color recording.

[Claim 21]

20 An output system which includes an icon display control device for displaying, by using an icon, a status of a output device connected through a line, the output device characterized in that the display control device has:

acquiring means for acquiring status information of the output device;

25 storing means for storing a plurality of pieces of icon information;



selection means for selecting corresponding icon information from a plurality of icon information stored in the storing means, on the basis of the status information acquired by the acquiring means; and

display means for displaying an icon on the basis of icon information selected by the selection means, and

the output device has transmission means for transmitting status information indicating the status of the output device to the display control device.

[Claim 22]

An output system which includes an icon display control device for displaying, by using an icon, a status of a output device connected through a line, the output device characterized in that the display control device has:

acquiring means for acquiring status information of the output device;

storing means for storing icon information;

changing means for changing a display form of icon information stored in the storing means, on the basis of the status information acquired by the acquiring means; and

display means for displaying an icon on the basis of icon information of which display form is changed by the changing means, and,

the output device has transmission means for transmitting status information indicating the status of the output device to the display control device.

[Claim 23]

The output system according to claim 21 or claim 22, wherein the output device is a color printer, and the status information includes information indicating whether or not the color printer is capable of color printing.

5 [Claim 24]

The output system according to claim 22, wherein the changing means changes the icon information so that the icon becomes monochrome or reversed.

[Claim 25]

10 The output system according to claim 21 or claim 22, wherein the transmission means transmits, when the status of the output device changes, status information from the output device to the display control device.

[Claim 26]

15 The output system according to claim 21 or claim 22, wherein the transmission means transmits, when a request signal is issued to the output device by a program executed in the display control device, status information corresponding to the request signal.

[Claim 27]

20 The output system according to any one of claims 21 to 26, wherein the output device is connected through a network.

[Claim 28]

The output system according to any one of claims 21 to 27, wherein the status information contains information showing whether  
25 or not the output device is in the online status.

[Claim 29]

The output system according to any one of claims 21 to 27, wherein the status information includes information indicating whether or not the output device has run out of toner.

[Claim 30]

5           The output system according to any one of claims 21 to 27, wherein the output device is a color-recording device, and the status information includes information indicating whether or not the color-recording device has a recording medium for color recording.

[Claim 31]

10           A recording medium, which is readable by a computer, for storing an icon display control program for allowing a status of a output device connected through a line to be displayed by using an icon, the recording medium characterized by comprising:

15           a acquiring step module for acquiring status information in a output device;

          a step module for selecting, based on the acquired status information, the corresponding icon data from a plurality of pieces of icon data stored in a memory; and

20           a display step module for displaying an icon on the basis of the selected icon information.

[Claim 32]

25           A recording medium, which is readable by a computer, for storing an icon display control program for allowing a status of an output device connected through a line to be displayed by using an icon, the recording medium characterized by comprising:

          a acquiring step module for acquiring the status information in

the output device;

a step module for changing a display form of icon information stored in a memory, on the basis of the acquired status information; and

5 a display step module for displaying an icon, on the basis of the icon information of which the display form is changed.

#### [Detailed Description of the Invention]

[0001]

10 [Technical Field to Which the Invention Pertains]

The present invention relates to an icon display control device in which an output device is connected through a line, to a method thereof, to an output system having the device, and to a recording medium for recording steps of the method.

15 [0002]

[Prior Art]

20 So far, in a computer instrument using a color printer and a printer by connecting them locally or through a network, when a printer device connected to the computer instrument is displayed in an icon format, there is an icon display method for allowing determination of a model of the printer device and for determining whether the printer device is a color printer or a monochrome printer. In addition, in order to indicate whether or not the printer device can be used, there is a method of displaying an icon after changing the icon form thereof.

25 [0003]

[Means for Solving the Problem]

When the printer device connected is a color printer, the printer device can be determined as a color printer by a conventional approach. However, for example, there is a case where the printer device can print in monochrome and not in color because of exhaustion of toner or ink. In this case, such a status cannot be determined from a content displayed on a computer instrument by the conventional approach as described above.

[0004]

The present invention was created in consideration of the above conventional instance, and an object thereof is to provide an icon display control method, which enables to observe a status of an output device by icon display on the computer instrument disposed separately from the output device, a device thereof and an output system having the device.

[0005]

Another object of the present invention is to provide an icon display control method, which can properly grasp the status of the output device while changing a display form of the icon to display, a device thereof and an output system having the device.

[0006]

Still another object of the present invention is to provide an icon display control method, which can distinguish easily by the screen display of a host instrument whether or not the color print device can operate color printing or whether or not the color print device can print in monochrome, a device thereof and an output system having the device.

[0007]

[Means for Solving the Problem]

In order to achieve the foregoing object, the icon display control device according to the present invention comprises the following configuration. An icon display control device for displaying, by using an icon, a status of an output device connected through a line. The icon display control device includes: acquiring means for acquiring status information of an output device; storing means for storing a plurality of pieces of icon information; selection means for selecting corresponding icon information from a plurality of pieces of icon information stored in the storing means on the basis of the status information acquired by the acquiring means; and display means for displaying an icon on the basis of the icon information selected by the selection means.

[0008]

In order to achieve the foregoing object, the icon display control method according to the present invention comprises the following steps. An icon display control method for displaying, by using an icon, a status of a output device connected through a line. The icon display control method has: a acquiring step of acquiring status information of an output device; a step of changing a display form of icon information stored in a memory, on the basis of the acquired status information; and a step of displaying an icon on the basis of the icon information of which the display form is changed.

[0009]

In order to achieve the foregoing object, the output system

including the icon display control device according to the present invention comprises the following configuration. An output system including an icon display control device for displaying, by using an icon, a status of an output device connected through a line. The display control device has: acquiring means for acquiring the status information of an output device; storing means for storing a plurality of pieces of icon information; selection means for selecting corresponding icon information from a plurality of pieces of icon information stored in the storing means, on the basis of the status information acquired by the acquiring means; and display means for displaying an icon on the basis of icon information selected by the selection means. The output device has transmission means for transmitting status information indicating the status of the output device to the display control device.

[0010]

[Mode for Carrying Out the Invention]

[Embodiment 1]

Fig. 1 is a block diagram showing a configuration of a printing system of embodiment 1 according to the present invention.

[0011]

In Fig. 1, reference numeral 1 denotes a color printer, reference numeral 2 denotes an information transfer unit for transferring status information indicating the status of the color printer 1 to a computer instrument 3. Note that, this color printer 1 may be any one system of printer devices of ink jet system, laser beam system, thermal transfer system and the like. The computer instrument 3 is connected to the color printer 1 through a line, a cable

or the like, and information from the color printer 1 is received by an information transfer unit 4. Reference numeral 5 denotes an icon storage unit for holding a plurality of icon data. Reference numeral 6 denotes an icon selection unit for selecting and taking out one icon data from the icon storage unit 5 on the basis of the information received by the information transfer unit 4. Reference numeral 7 denotes a display unit for operating display on the basis of the icon data selected in the icon selection unit 6. Reference numeral 8 denotes a disk drive for setting a disk 9 such as a flexible disk, and also can read to execute program data stored in the disk 9. Incidentally, modules of a procedure program stored in the disk 9 will be described later with reference to Fig. 20.

[0012]

Fig. 2 is a diagram showing contents of information to be sent and received between the color printer 1 and the computer instrument 3.

[0013]

In Fig. 2, reference numeral 21 denotes information indicating the category of the color printer 1 and, here, "LBP-1 Color" is set to indicate that the color printer 1 is a color laser beam printer (LBP.) Reference numeral 22 denotes status information indicating the status of the color printer 1 and, here, it is indicated that the color printer 1 is in online status "On-Line." Reference numeral 23 denotes information indicating a toner status of the printer and, here, it is indicated that yellow (Y) toner has been exhausted. Reference numeral 24 denotes information indicating the category of recording paper loaded into the



color printer 1 and, here, it can be learned that paper for color printing has been set.

[0014]

Fig. 3 is a flow chart showing processing in the computer instrument 3 of the present embodiment, and particularly focusing on processing in the icon selection unit 6.

[0015]

An icon display request is periodically outputted from an OS executed in the computer instrument 3. When this request is inputted in step S1, the processing proceeds to step S2 and a command corresponding to this icon display request is outputted to the color printer 1. In this way, the color printer 1 responds, by sending data (status information) as shown in Fig. 2 to the computer instrument 3 in response to the command.

[0016]

In the computer instrument 3, on the basis of this received information, first in step S3, whether or not the color printer 1 is in usable status (whether it is in online status based on information 22 in Fig. 2) is determined. If it is not in online status, the processing proceeds to step 8 and an icon, which indicates that the color printer 1 is not usable, is selected and acquired from a plurality of pieces of icon data stored in the icon storage unit 5. In step S9, the OS is then requested to display the selected icon on the display unit 7.

[0017]

On the other hand, in the step S3, if the color printer 1 is usable, the processing proceeds to step S4 and determination whether

or not color toner of the printer 1 is exhausted is made, on the basis of information 23 in Fig. 2. If color toner is exhausted (black toner is present,) the processing proceeds to step S7 and an icon, which indicates that only monochrome printing is possible, is selected and acquired from the icon storage unit 5. In step S9, an instruction for displaying the icon is made.

[0018]

In the step 4, when color toner is not exhausted, the processing proceeds to step S5 and determination whether or not paper loaded into the color printer 1 is paper used for color printing is made. If paper used for monochrome printing is loaded, the processing proceeds to step S7 and an icon, which indicates that only monochrome printing is possible, is displayed on the display unit 7 as described above.

[0019]

In the step S5, when it is determined that color printing is possible in the color printer 1, the processing proceeds to step S6 and an icon, which indicates that color printing is possible in the color printer 1, is selected from a plurality of icon data stored in the icon storage unit 5. In the step S9, a request for displaying the received icon on the display unit 7 is made, and the control is returned to the OS.

[0020]

As described above, according to the present embodiment 1, corresponding to whether or not color printing is possible in the color printer 1 connected to the computer instrument, an icon display indicating the status can be changed and displayed on the screen of the computer instrument 3. Therefore, an operator of the computer

instrument 3 can perform proper printing according to the status of the printer connected thereto.

[Embodiment 2]

[0021]

5           Next, the operation of embodiment 2 of the present invention will be described with reference to flow charts of Figs. 4 and 5. In this embodiment 2, a printer information request command is periodically issued from the computer instrument 3 to color printer 1 in embodiment 1 described above. On the contrary, in this embodiment 2,  
10       the command is issued to the computer instrument 3 when the status of the color printer 1 is changed.

[0022]

          Fig. 4 is the flow chart showing the operation of an information transfer unit 4 of the computer instrument 3 in the present  
15       embodiment 2. Fig. 5 is the flow chart showing the processing, which is executed by this, in the icon selection unit 6 of the computer instrument 3.

[0023]

          In Fig. 4, when the status of the color printer 1 is changed, a  
20       signal indicating the change of the status of the color printer 1 is sent from an information transfer unit 2 of the color printer 1 to the information transfer unit 4 of the computer instrument 3. In this way, in step S11, the information transfer unit 4 receives the signal. Thus, the processing proceeds to step S12 and a request to the information  
25       transfer unit 2 of the color printer 1 for printer information (status information) is made. The printer information (data format of Fig. 2)

returned from the color printer 1 in response to this request is acquired. The processing then proceeds to step S13 and the information transfer unit 4 of the computer instrument 3 acquires the printer information, triggering the icon selection unit 6 as well as sending the received printer information (S14.) Then, the information transfer unit 4 is returned to the status before receiving signal from the color printer 1.

[0024]

Fig. 5 is the flow chart showing the processing, which is executed by this, in the icon selection unit 6 of the computer instrument 3. First in step S15, when a trigger signal from the information transfer unit 4 is detected, the processing proceeds to step S16 and printer information sent from the color printer 1 is acquired. Then, processing similar to that of the flow chart shown in Fig. 3 is performed. An icon indicating each status of the color printer 1 is then selected and acquired from the icon storage unit 5 (S6, S7, and S8.) The received icon is displayed on the screen of a display unit 7 (S9.) In such a way, a corresponding icon is displayed on the screen. Thereafter, the icon selection unit 6 is returned to the status before being triggered by the information transfer unit 4.

[0025]

Also in this embodiment 2, as in the case of embodiment 1 described above, icon data to be displayed on the computer instrument 3 can be changed according to the status whether or not color printing is possible in the color printer 1. Therefore, an operator of the computer instrument 3 can correctly grasp the status of the color printer 1 on the basis of the icon display.

[0026]

The embodiment of the present invention is characterized in that the display showing the status of the color printer 1 is operated on the basis of the status information from the color printer 1. Thus, in the embodiments 1 and 2 described above, whether or not color printing is possible in the color printer 1 is evaluated on the basis of presence or absence of color toner and the category of paper used for printing. However, the present invention is not limited to this, when information other than that described herewith is included in information sent back from the color printer 1, and when any information influencing color printing is contained in the information, evaluation thereof may be sequentially carried out for selection of a display icon corresponding thereto.

[0027]

[Embodiment 3]

Fig. 6 is a block diagram showing a configuration of a printing system of embodiment 3 of the present invention. A part common to Fig. 1 as described above will be indicated with a same number and its explanation will be omitted.

[0028]

In Fig. 6, a computer 3a includes an icon changing unit 55 for changing an icon to be displayed on a display unit 7, based on data from a color printer 1, and a monitor unit 56 for requesting the icon changing unit 55 to change the icon data, based on the information received from the color printer 1. The computer 3a further includes a data storage unit 58 for storing icon data.

[0029]

Fig. 7 is a table showing an example of changing icon display in the icon change unit 55.

[0030]

5           Upon receiving change request data as shown in Fig. 7 from the monitor unit 56, the icon change unit 55 changes icon display data stored in the icon storage unit 58 in accordance with the data.

[0031]

10           Data "0" expresses "no change," data "1" expresses "monotonous" icon display," and data "2" expresses "reversed display" of the icon.

[0032]

15           Figs 8 to 10 are flow charts, each showing icon selection processing. The operation of the present embodiment 3 will be described in accordance with these flow charts.

[0033]

Fig. 8 is the flow chart showing processing in an information transfer unit 4 of the present embodiment 3.

[0034]

20           In step S21, if the status of the color printer 1 is changed, the processing proceeds to step S22 when the signal indicating the change of the status is sent from an information transfer unit 2 of the printer 1 to an information transfer unit 4 of the computer instrument 3a. In the step S22, upon receiving the signal from the information transfer unit 4, the information transfer unit 4 requests printer information from the information transfer unit 2 of the color printer 1. Next, the

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processing proceeds to step S23, where printer information returned from the color printer 1 in response to this request is acquired. The processing then proceeds to step S24 and the monitor unit 56 is triggered by the information transfer unit 4. In step 25, the received information is outputted to the monitor unit 56. Then, the information transfer unit 4 is returned to the former status in step 21. Note that, the information received in the step S23 is assumed to have, for example, a format as shown in Fig. 2.

[0035]

Fig. 9 is the flow chart showing the operation of the monitor unit 56 of the computer instrument 3a in this embodiment 3.

[0036]

First in step S26, when a trigger (issued in the step 24 in Fig. 8) from the information transfer unit 4 is detected, the processing proceeds to step 27 and printer status information (outputted in the step S25) received from the color printer 1 is acquired. Next, the processing proceeds to step S28 and determination whether or not the color printer 1 is usable is made, on the basis of the information from the information transfer unit 2 of the color printer 1, as in the above-described steps S2 to S5 in Fig. 3. In step 28, when the color printer 1 is not usable, the processing proceeds to step 33 and information code (for example, "2" reverse) indicating that it is unusable is sent to the icon change unit 55.

[0037]

When the color printer 1 is usable, the processing proceeds to step 29 and determination whether or not color toner is exhausted is

made, on the basis of printer information. If so, the processing proceeds to step S32 and information code (for example, "1" monotonous,) indicating that only monochromic printing is possible is sent to the monitor unit 55.

5 [0038]

Moreover, in step 29, when a remained amount of color toner is exists, the processing proceeds to step S30 and determination whether or not paper loaded into the color printer 1 is print paper used for color printing is made. If paper used for monochrome printing is loaded, the processing proceeds to step S32 and the above-described processing is performed. If paper used for color printing is loaded, the processing proceeds to step S31 and information code (for example, "0" no change,) indicating that color printing is possible is sent to the monitor unit 55.

10 [0039]

After the processing of these steps S31 to S33 is finished, the monitor unit 56 is returned to the status before being triggered by the information transfer unit 4.

15 [0040]

Fig. 10 is a flow chart showing the operation of the icon change unit 55 of embodiment 3.

20 [0041]

First in step S41, the icon change unit 55 is in wait status. In step S42, upon receiving the information code from the monitor unit 55, the processing proceeds to step S43 and an icon data stored in the icon storage unit 58 is read on the basis of the change data and the contents thereof, which are shown in Fig. 6. In step S44, the icon data is

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outputted as it is or after changed, according to the instruction of the change data. In other words, in this step, if information code from the monitor unit 56 is "0," the icon data is displayed on the display unit 7 as it is without being changed. On the other hand, if information code from the monitor unit 56 is "1," color data is changed to monochromic data and displayed on the display unit 7. In addition, if information code from the monitor unit 56 is "2," icon data read from the icon storage unit 58 is reversed and displayed on the display unit 7. Thereafter, the icon change unit 55 is returned to the original wait status.

[0042]

As described above, according to the present embodiment 3, the display format of one icon data is changed and displayed distinguishably according to the status whether or not the color printer is capable of color printing. Therefore, it is possible to confirm whether or not the color printer 1 connected is capable of color printing, only by viewing the icon display.

[Embodiment 4]

[0043]

Fig. 11 is a block diagram showing a configuration of a printing system of embodiment 4 of the present invention.

[0044]

In Fig. 11, reference numeral 80 denotes a network, reference numeral 81 denotes a color printer and operates communication with other instruments connected to the network 80 through a communication unit 82. Reference numeral 83 denotes an information

transfer unit for transferring the status information of the color printer 81 to the network 80 through the communication unit 82.

[0045]

Reference numeral 84 denotes a computer instrument connected to the network 80 and reference numeral 85 denotes a communication unit for controlling receiving and transmission of data the from network 80. Reference numeral 86 denotes an icon data acquiring unit for acquiring icon data from the computer instrument 89 holding icon data. Reference numeral 87 denotes an analysis unit for receiving printer status information from the information transfer unit 83 of the color printer 81 through communication units 85 and 82, and for analyzing its printer status. Reference numeral 88 denotes an icon display unit for displaying an icon on the display screen of the computer instrument 84.

[0046]

Reference numeral 89 denotes the computer instrument in which icon data is stored, 8a denotes a communication unit of the computer instrument 89, 8b denotes a storage unit for storing icon data.

[0047]

Fig. 12 is the flow chart showing the processing of icon selection in the analysis unit 87 of computer instrument 84. The operation of the present embodiment 4 will be described in accordance with this flow chart.

[0048]

When an icon display request is periodically inputted from an OS executed in the computer instrument 84, the icon data acquisition

unit 86 requests printer information from the color printer 81 (S51.)  
In this way, in step S52, the printer information sent from the color  
printer 81 is acquired. The information received in such a way has  
data format as presented, for example, in Fig. 2 described above.

5 [0049]

In steps S53 to S55, as in the steps S3 to S5 of Fig. 3 described  
above, whether or not the color printer 81 is usable is determined. If it  
is not usable, the processing proceeds to step 58, where a request for an  
icon indicating unusable is made to the storage unit 8b of the computer  
10 instrument 89. If it is usable, the processing proceeds to step 54 and  
determination whether or not color toner is exhausted is made. If  
toner is exhausted, the processing proceeds to step 57 and an request  
is made to the storage unit 8b of the computer instrument 89 to send an  
icon data indicating that only monochrome printing is possible.

15 [0050]

Further, In step 54, when no problem is found in color toner,  
the processing proceeds to step 55 and determination whether or not  
paper loaded into the color printer 81 is paper used for color printing is  
made. When paper used for color printing has not been loaded, the  
20 processing proceeds to step S57 and a request is made to the storage  
unit 8b of computer instrument 89 to send an icon data indicating that  
only monochrome printing is possible.

[0051]

When no problem is found in the determination in the step 55,  
25 the processing proceeds to step 56 and a request is made to the storage  
unit 8b of the computer instrument 89 to send an icon data indicating

that color printing is possible (S56.) Following the end of processing of any one of these steps S56 to S58, the processing proceeds to Step S59 and the icon data sent from the storage unit 8b of the computer instrument 89 is acquired. The processing then proceeds to step S60 and a request for displaying the acquired icon data on the screen of display unit 88 is made. Following the end of the icon display in this way, display end is responded to the OS of the computer instrument 84 and its control is sent back to the OS. In such a way, the display unit 88 displays the icon received from the computer instrument 89 on the basis of this request.

[0052]

As described above, according to the present embodiment 4, in a color printer connected through a network, whether or not color printing is possible can be determined to change the icon data to be displayed on the computer instrument. Thus, a user of the computer instrument can correctly grasp the status of the color printer connected thereto only by confirming an icon, making it possible for the user to carry out proper printing.

[0053]

Moreover, in the present embodiment 4, the icon data is held in other computer instrument 89 than computer instrument 84. However, the icon data may be held in computer instrument 84. Also in embodiment 4, as in the above-described embodiments, one icon data may be stored in the storage unit 8b, and may be displayed after the icon data is changed to, for example, data as shown in Fig. 7, by following a request for icon change according to the result of analysis in

the analysis unit 87.

[Embodiment 5]

[0054]

Fig. 13 is a block diagram showing a configuration of a computer system of embodiment 5 of the present invention. A part common to Fig. 11 as described above will be indicated with the same number and its explanation will be omitted.

[0055]

In Fig. 13, reference numeral 104 denotes a computer instrument for managing the color printer 81, which has a communication unit 105, a monitor unit 106 to hold the printer status information received from the color printer 81, and a status analyzing unit 107 to analyze the status of the color printer 81 on the basis of the status information. Reference numeral 10b denotes a computer instrument using the color printer 81, which includes a communication unit 55, an icon acquisition unit 10d, a display unit 10e and the like. The icon acquisition unit 10d acquires, based on the printer status information from the computer instrument 104, an icon data corresponding to the status of the color printer 81 from a storage unit 8b of the computer instrument 89. The display unit 10e displays the acquired icon on the screen.

[0056]

Figs. 14 to 16 are flow charts showing the processing of icon selection in the present embodiment 5. In accordance with these flow charts, the operation of the present embodiment 5 will be described below.

[0057]

Fig. 14 is the flow chart showing processing in the color printer 81. First in step S61, upon detection of the status change of the color printer 81, the information transfer unit 83 triggers the computer instrument 104 through the communication unit 82 and the network 80, sending information of the status change of the color printer 81 in step S63. Then, the information transfer unit 83 is returned to the status before detection in step S61.

[0058]

Fig. 15 is the flow chart showing processing in the computer instrument 104.

[0059]

In step S71, the analyzing unit 107 receives the trigger (corresponding to S62 in Fig. 14) from the color printer 81. At the same time, the analyzing unit 107 acquires status information (issued in S63 in Fig. 14) of the color printer 81 from information transfer unit 103 of color printer 81 (S72.) The information acquired in such a way has data format such as that shown in Fig. 2. Next, in steps S73 to S75, as in the steps S3 to S5 described above, whether or not the color printer 81 is usable is determined on the basis of this received data. When it is not usable, information code (for example, "2" reverse) indicating that it is unusable is stored in the monitor unit 106 (S78.)

[0060]

When it is usable in step S73, the processing proceeds to step S74 and determination whether or not color toner is exhausted is made. If so, the processing proceeds to step S74, where information code (for

example, "1" monotonous,) indicating that monochrome printing is possible is stored in the monitor unit 106.

[0061]

In addition, when there is no problem with color toner, the processing proceeds to step S75 and determination whether or not the loaded paper is paper used for color is made (S75.) If it is not so, namely, if the loaded paper is paper used for monochrome, information code (for example, "1" monotonous,) indicating that only monochrome printing is possible is stored in the monitor unit 106.

[0062]

If there is no problem with the evaluation as described above, the processing proceeds to step S76, where information code (for example, "0" no change,) indicating that color printing is possible, is stored in the monitor unit 106. In this way, after any one of processes of steps S76 to S78 is ended, the computer instrument 104 is returned to the status before being triggered by the color printer 81.

[0063]

Fig. 16 shows the flow chart showing processing in the computer instrument 10b.

[0064]

When the icon display request comes from the OS of the computer instrument 10b, the processing proceeds to step 81 and icon acquisition unit 10d requests the status information of the printer 81 from the monitor unit 106 of the computer instrument 104 through the communication unit 10c and the network 80. In step S82, the icon acquisition unit then acquires the printer status information returned

in response to the request. On the basis of this status information, relational data as shown in Fig., 17 is prepared (S83.)

[0065]

5 In Fig. 17, if data is "0," a color icon is expressed; "1," a monochrome icon; and "2," a stop icon.

[0066]

10 Subsequently, the processing proceeds to step S84 and an icon corresponding to each of status information from the storage unit 8b of the computer instrument 89 is acquired. Thereafter, the processing proceeds to step S85 and a request for display is made to the display unit 10e of the computer instrument 10b. In this way, after the corresponding icon is displayed on the screen, display end is responded to the OS and the control is returned to the OS.

[0067]

15 By the configuration as described above, according to the present embodiment 5, when a color printer connected through a network is managed by a computer instrument, information of the color printer can be received from the computer instrument to display by receiving a printer icon according to the status whether or not color printing is possible by the color printer. In this way, a user of the computer instrument can grasp whether or not color printing is possible only by viewing the icon displayed on the screen.

[0068]

25 In the present embodiment 5, an icon data is held in other computer instrument 89 than the computer instrument 10b. However, there is no problem to hold the icon data in the computer instrument



10b. In addition, in the present embodiment 5, it may be a satisfied way to have in a function to change one icon data in the computer instrument 10d and acquire an icon data from other or hold in the computer instrument 10d, and change the icon data with reference to the relational data as shown in Fig. 7.

[0069]

[Embodiment 6]

Fig. 18 is a block diagram showing a configuration of a computer system of embodiment 6 of the present invention. A part common to Fig. 13 as described above will be indicated with the same number and its explanation will be omitted.

[0070]

Note that, it is different from Fig. 13 in that while the monitor unit 106 in Fig. 13 holds the printer status determined based on the status information from the color printer 81, the monitor unit 136 in this embodiment holds the printer status information received from the color printer 81 as it is. In addition, it is different from Fig. 13 in that the icon acquisition unit 13d of the computer instrument 10b has the function of the computer instrument 10d of Fig. 13 as described above, as well as acquires the printer information from the monitor unit 136 to prepare the printer status information by analyzing the printer information.

[0071]

As described above, even when a part which determines printer status is located in any of a computer for managing the printer 81 and a computer using the color printer 81, it is possible to evaluate

the information of the color printer 81 to acquire and display the printer icon in accordance with the status whether or not color printing is possible. In this way, as in the case of embodiment described above, a user can grasp the status of color printer only by viewing the displayed icon.

[0072]

[Embodiment 7]

Fig. 19 is a block diagram showing a configuration of a computer system of embodiment 7 of the present invention. A part common to Fig. 13 as described above will be indicated with the same number and its explanation will be omitted.

[0073]

In Fig. 19, reference numeral 144 denotes a computer instrument for managing the color printer 81, which includes a communication unit 145, an icon holding unit 146 to hold an icon, a status analysis unit 147 to receive information from the color printer 81 to analyze the status of the color printer 81, and a storing unit 146 to store a plurality of icon data.

[0074]

As in the case of embodiment 5 described above, upon detection of the change of the status of the color printer 81, the information transfer unit 83 of the color printer 81 triggers the computer instrument 144 to send information of the changed status. In this way, the status analysis unit 147, in accordance with the trigger from the color printer 81, acquires the status information of the color printer 81. On the basis of this acquired status information, as in the embodiment

described above, whether or not the color printer 81 is usable is determined. Then, in accordance with the status of the color printer 81, from a plurality of icon data stored in the icon storage unit 148, an icon suitable for the status of the color printer 81 is selected and stored in the icon holding unit 146.

[0075]

Moreover, the computer instrument 10b acquires, when the icon display request comes from the OS executed in this computer instrument 10b, an icon data held in the icon holding unit 146 and request a display unit 10e to display it. After this screen is displayed, display end is responded to the OS of the computer instrument 10b and the control is returned to the OS. In this way, upon receiving this request, the icon is displayed on the screen in the screen unit 10e.

[0076]

As described above, according to the present embodiment 7, status information of a color printer connected through a network can be acquired, and thus it is possible, in a host instrument, to operate an icon display corresponding to the status.

[0077]

Incidentally, in the present embodiment 7, the icon data is held in the computer instrument 144 for managing the status of the color printer 81. However, as in the embodiment 5 described above, the icon data may be held in other computer instruments on the network 80.

[0078]

Also in the present embodiment 7, the computer instrument

144 may be configured to hold one kind of icon data, and to display it while changing the icon data according to the status of the color printer 81.

[0079]

5           Note that, the present invention may be applied to a system composed of a plurality of instruments (for example, a host computer, an interface instrument, a reader and a printer) and also may be applied to a device composed of one instrument (for example, a copier, a facsimile device or the like.)

10          [0080]

          The object of the present invention can be also achieved by supplying a memory medium, in which a program code of software for realizing the function of the above-described embodiments is stored, to a system or device, and by allowing a computer (or CPU and MPU) of  
15          the system or device to read and execute the program code stored in the memory medium.

[0081]

          In this case, the program code itself, which is read from the memory medium, realizes the function of the above-described  
20          embodiments, and the memory medium in which the program code has been stored constitutes the present invention.

[0082]

          For the memory medium for supplying the program code, it is possible to use, for example, a flexible disk, a hard disk, an optical disk,  
25          a magneto-optic disk, a CD-ROM, a CD-R, a magnetic tape, a nonvolatile memory card, a ROM and the like.

[0083]

Further, by executing the program code read out by the computer, the function of the above-described embodiments can be achieved. In addition, the OS (operating system) operating on the computer partially or totally performs an actual process based on the instruction of the program code, and thereby the function of the above-described embodiments can be achieved.

[0084]

Furthermore, the program code read out from the memory medium is written in a memory mounted on a function-extending board inserted in the computer, or in a function-extending unit connected to the computer. Thereafter, the function-extending board or the CPU mounted on the function-extending unit partially or totally carry out an actual process based on the instruction of the program code, and thereby the function of the above-described embodiments can be achieved.

[0085]

When the present invention is applied to the memory medium (disk 9 of Fig. 1,) the program code corresponding to the flow chart previously described is stored in the memory medium. Briefly, each module indicated on an example of a memory map shown in Fig. 20 is stored in the memory medium.

[0086]

In Fig. 20, reference numeral 201 denotes a module for storing a display request trigger input process. This is, for example, started by the trigger from the OS executed on the computer instrument (S1,)

or started by a request signal from a color printer when a change occurs in the status of the color printer (S11.) Reference numeral 202 denotes a printer information-acquiring module, which indicates a process for requesting the state of the printer by inputting the status information sent from the printer (S2 and S12.) Reference numeral 203 denotes a determination module, which determines, on the basis of the status information sent from the printer, the printer status such as, whether or not the printer is in online status, whether or not toner is exhausted, whether or not recording paper is proper and the like. Reference numeral 204 denotes an icon selection module, which is, here, a procedure for selecting a corresponding icon from a plurality of pieces of icon information according to the status of the printer, or for changing a specific icon according to the status of the printer. Reference numeral 205 denotes an icon display request module, which indicates a procedure for operating display on the basis of the icon information changed or selected in the module 204.

[0087]

According to the present embodiment as described above, in accordance with the status of a printer connected, an icon, for example, which is distinguishable whether or not color printing is possible can be displayed on a host instrument and. Thus, a user can correctly judge the status of the printer to perform printing.

[0088]

According to the embodiment of the present invention, similar processing can be carried out through a network.

[0089]

According to the embodiment of the present invention, in a color printer shared through a network, when a computer for managing the color printer exists, it is possible to obtain the status information of the color printer through the computer and to display the contents thereof.

[0090]

Further, according to the present embodiment of the present invention, in a color printer shared through a network, when a computer for managing the color printer exists, the computer can determine the status of the printer and provide an icon corresponding to the printer status with the computer using the color printer. Thus, it is possible, also in a network environment, for the user to correctly grasp the status of the printer.

[0091]

According to the embodiment of the present invention, various statuses can be distinguishably displayed by changing one icon display form, without using a plurality of icon data.

[0092]

[Effect of the Invention]

According to the present invention as described above, there is an effect that a status of an output device can be confirmed by an icon display, on a computer instrument disposed separately from an output device.

[0093]

Further, according to the present invention, it is possible to correctly grasp the status of a output device by displaying an icon,

while changing the display form thereof according to the status of the output device.

[0094]

Still further, according to the present invention, there is an effect that it is possible to distinguish easily, on the screen display of a host instrument, whether or not a color printer device connected through a line can perform color printing, or whether or not the color printer can perform monochrome printing.

[0095]

[Brief Description of the Drawings]

Fig. 1 is a block diagram showing a configuration of a computer system of embodiment 1 according to the present invention.

Fig. 2 is a diagram showing an example of printer information of an embodiment.

Fig. 3 is a flow chart showing processing in an icon selection unit of embodiment 1.

Fig. 4 is a flow chart showing the operation of an information transfer unit 4 of a computer instrument 3 in the embodiment 2 according to the present invention.

Fig. 5 is a flow chart showing the processing in an icon selection unit 6 of the computer instrument in the embodiment 2.

Fig. 6 is a block diagram showing a configuration of a printing system of embodiment 3 of the present invention.

Fig. 7 is a table showing an example of information code indicating printer statuses.

Fig. 8 is a flow chart showing processing in the information transfer



unit 4 of embodiment 3 according to the present invention.

Fig. 9 is a flow chart showing the operation of a unit 56 of computer instrument 3a in embodiment 3 according to the present invention.

5 Fig. 10 is a flow chart showing the operation of an icon change unit 55 of embodiment 3 according to the present invention.

Fig. 11 is a block diagram showing a configuration of a computer system of embodiment 4 according to the present invention.

Fig. 12 a flow chart showing processing of icon selection in an analyzing unit 87 of an computer instrument 84 of embodiment 4.

10 Fig. 13 is a block diagram showing a configuration of a computer system of embodiment 5 of the present invention.

Fig. 14 is a flow chart showing processing in a color printer 81 of embodiment 5 of the present invention.

15 Fig. 15 is a flow chart showing processing in a computer instrument 104 of embodiment 5 of the present invention.

Fig. 16 is a flow chart showing processing in a computer instrument 10b of embodiment 5 of the present invention.

Fig. 17 is a table showing an example of relational data prepared on the basis of printer status information in embodiment 5.

20 Fig. 18 is a block diagram showing a configuration of a computer system of embodiment 6 of the present invention.

Fig. 19 is a block diagram showing a configuration of a computer system of embodiment 7 of the present invention.

25 Fig. 20 is a block diagram showing a configuration of a program module structure of a memory medium storing a control program executed in the computer system according to the embodiment of the present

invention.

Continued from the front page

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Fig. 1

5        5        ICON STORAGE UNIT  
6        6        ICON SELECTION UNIT  
7        7        DISPLAY UNIT  
5        8        DISK DRIVE

Fig. 2

21        PRINTER CATEGORY  
22        STATUS  
10       23       TONER INFORMATION    NO Y TONER  
24       PAPER INFORMATION    FOR COLOR

Fig. 3

START

15       S1       RECEIVE ICON DISPLAY REQUEST  
         S2       ACQUIRE PRINTER INFORMATION  
         S3       STATUS = ONLINE?  
         S4       TONER OK?  
         S5       PAPER CATEGORY = FOR COLOR?  
20       S6       ACQUIRE COLOR ICON  
         S7       ACQUIRE MONOCHROME ICON  
         S8       ACQUIRE STOP ICON  
         S9       REQUEST ICON DISPLAY  
END

25

Fig. 4

START

S11 RECEIVE CHANGE SIGNAL

S12 ACQUIRE PRINTER INFORMATION

S13 ISSUE TRIGGER TO ICON SELECTION UNIT 6

5 S14 SEND PRINTER INFORMATION TO ICON SELECTION  
UNIT 6

END

Fig. 5

10 START

S15 RECEIVE TRIGGER

S16 ACQUIRE INFORMATION FROM INFORMATION  
TRANSFER UNIT 4

S17 GO TO S3 IN FIG. 3

15

Fig. 6

7 DISPLAY UNIT

55 ICON CHANGE UNIT

56 MONITOR UNIT

20 58 ICON STORAGE UNIT

Fig. 7

DATA

CONTENT

25 61 NO CHANGE

62 MAKE MONOTONE

63 REVERSE

Fig. 8

START

5 S21 RECEIVE CHANGE SIGNAL  
S22 REQUEST PRINTER INFORMATION  
S23 ACQUIRE PRINTER INFORMATION  
S24 ISSUE TRIGGER TO 56  
S25 SEND PRINTER INFORMATION TO 56  
10 END

Fig. 9

START

S26 RECEIVE TRIGGER  
15 S27 ACQUIRE PRINTER INFORMATION  
S28 STATUS = ONLINE?  
S29 TONER OK?  
S30 PAPER CATEGORY = FOR COLOR?  
S31 SEND INFORMATION CODE (0)  
20 S32 SEND INFORMATION CODE (1)  
S33 SEND INFORMATION CODE (2)  
RETURN

Fig. 10

25 START

S41 WAIT

S42 ACQUIRE INFORMATION CODE  
S43 REFERE MAP  
S44 CHANGE ICON DATA  
END

5

Fig. 11

85 COMMUNICATION UNIT  
86 ICON DATA AQUISITION UNIT  
87 ANALYSIS UNIT  
10 88 DISPLAY UNIT  
8a COMMUNICATION UNIT  
8b STORAGE UNIT

Fig. 12

15

START

S51 REQUEST PRINTER INFORMATION  
S52 ACQUIRE PRINTER INFORMATION  
S53 STATUS = ONLINE?  
S54 TONER OK?  
20 S55 PAPER CATEGORY = FOR COLOR?  
S56 REQUEST COLOR ICON FROM 8b  
S57 REQUEST MONOCHROME ICON FROM 8b  
S58 REQUEST STOP ICON FROM 8b  
S59 ACQUIRE ICON DATA FROM 8b  
25 S60 REQUEST DISPLAY  
END

Fig. 13

107 ANALYSIS UNIT  
106 MONITOR UNIT  
5 10d ICON ACQUISITION UNIT  
10e DISPLAY UNIT

Fig. 14

START

10 S61 RECEIVE CHANGE SIGNAL  
S62 ISSUE TRIGGER TO 104  
S63 SEND PRINTER INFORMATION TO 104  
S64 RETURN

15 Fig. 15

START

S71 RECEIVE TRIGGER  
S72 ACQUIRE PRINTER INFORMATION  
S73 STATUS = ONLINE?  
20 S74 TONER OK?  
S75 PAPER CATEGORY = FOR COLOR?  
S76 STORE INFORMATION CODE (0) IN 106  
S77 STORE INFORMATION CODE (1) IN 106  
S78 STORE INFORMATION CODE (2) IN 106  
25 Return



Fig. 16

START

S81 REQUEST INFORMATION CODE

S82 ACQUIRE INFORMATION CODE

5 S83 REFER MAP

S84 ACQUIRE ICON DATA

S85 REQUEST DISPLAY

END

10 Fig. 17

COLOR ICON

MONOCHROME

STOP ICON

15

Fig. 19

146 ICON HOLD UNIT

147 STATUS ANALYSIS UNIT

20 148 STORAGE UNIT

10d ICON ACQUISITION UNIT

10e DISPLAY UNIT

Fig. 20

25 DIRECTORY

201 DISPLAY REQUEST TRIGGER INPUT MODULE

- 202 PRINTER INFORMATION ACQUISITION MODULE
- 203 DECISION MODULE
- 204 ICON SELECTION (CHANGE) MODULE
- 205 ICON DISPLAY REQUEST MODULE

Fig.1

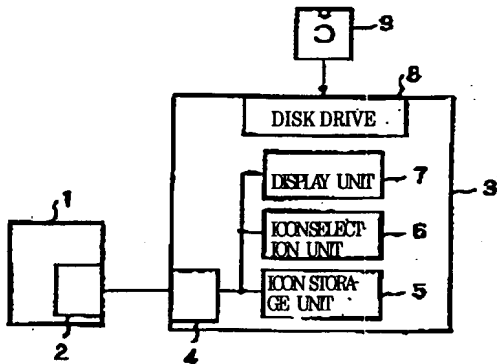


Fig.2

PRINTER CATEGORY	LBP 1Color	21
STATUS	On Line	22
TONER INFORMATION	NO Y TONER	23
PAPER INFORMATION	FOR COLOR	24

Fig.5

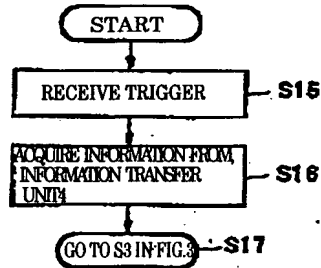


Fig.4

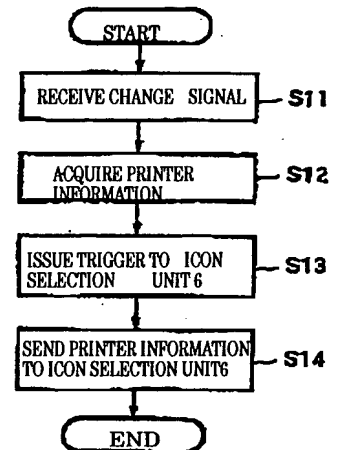


Fig.3

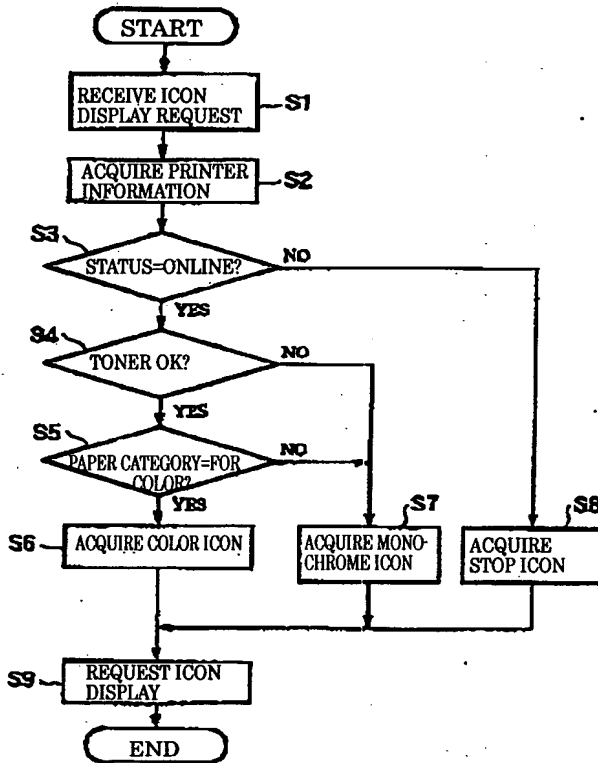


Fig.8

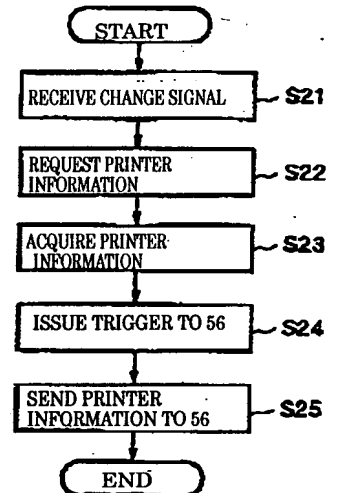


Fig.14

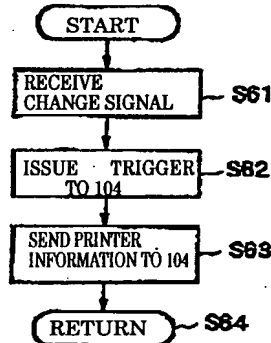


Fig.10

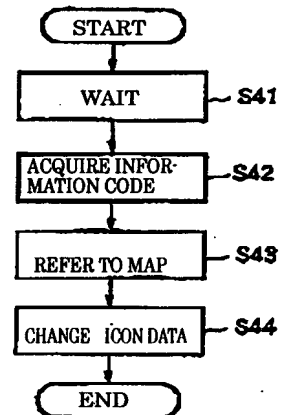


Fig.6

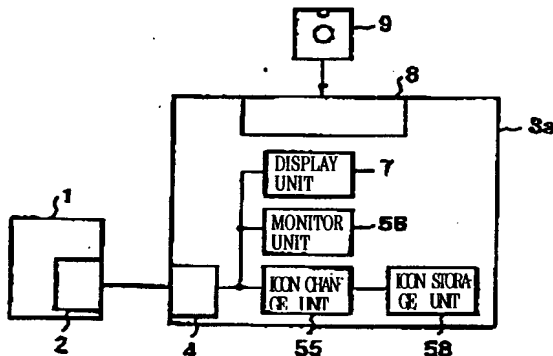


Fig.7

DATA	CONTENT	
0	NO CHANGE	61
1	MAKE MONOTONE	62
2	REVERSE	63

Fig.9

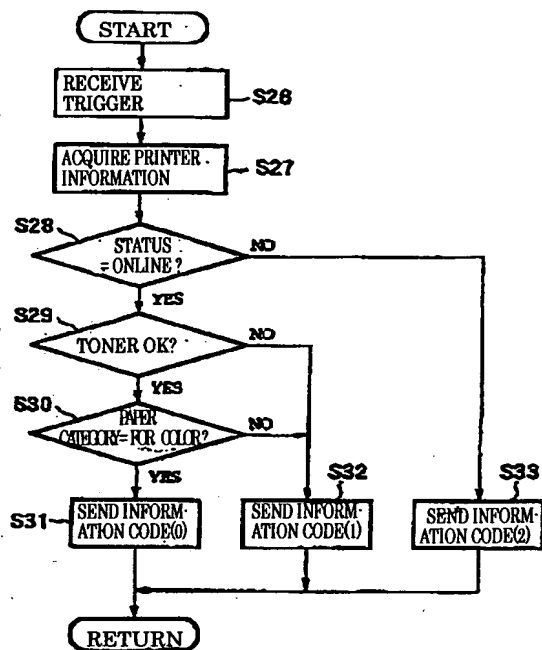


Fig.15

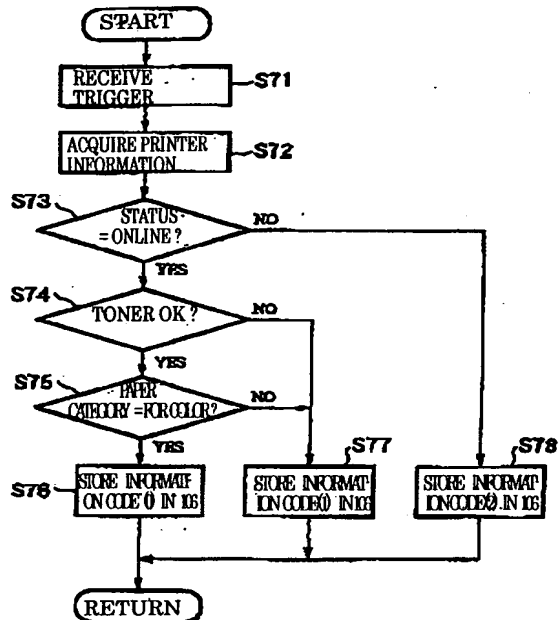


Fig.11

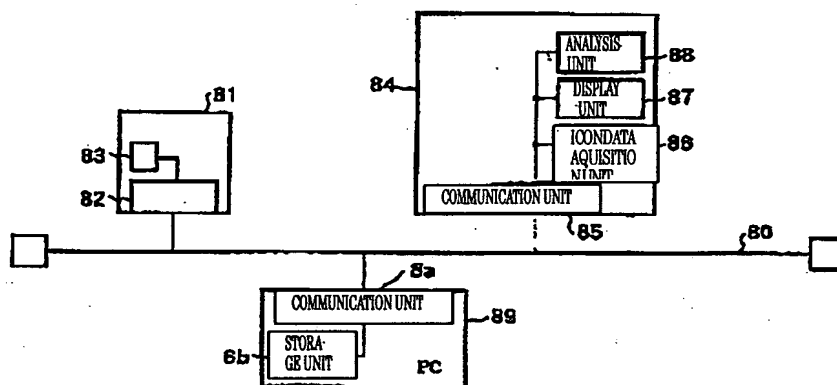


Fig.16

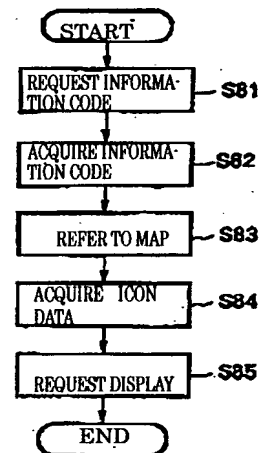


Fig.17

0	COLOR ICON	COLOR . ICN
1	MONOCHROME	MONO . ICN
2	STOP ICON	OFFLINE . ICN

Fig.20

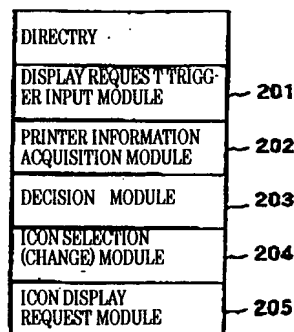


Fig.12

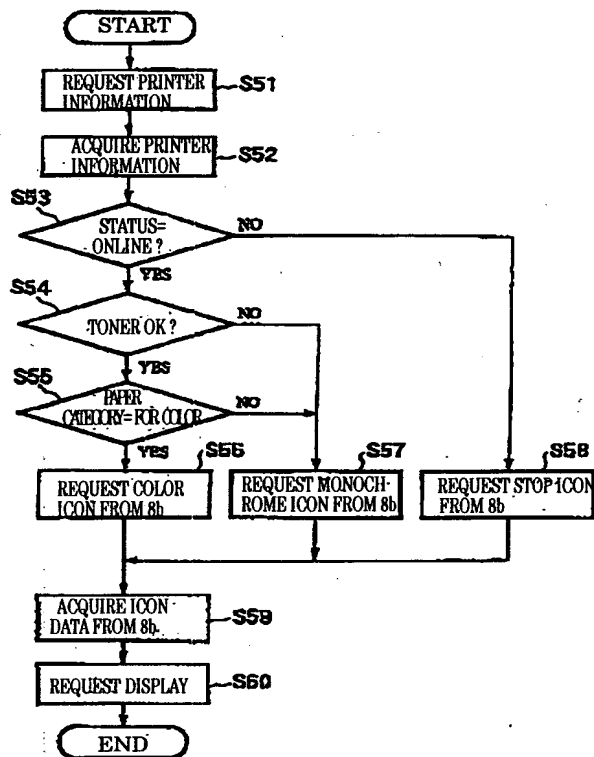


Fig.13

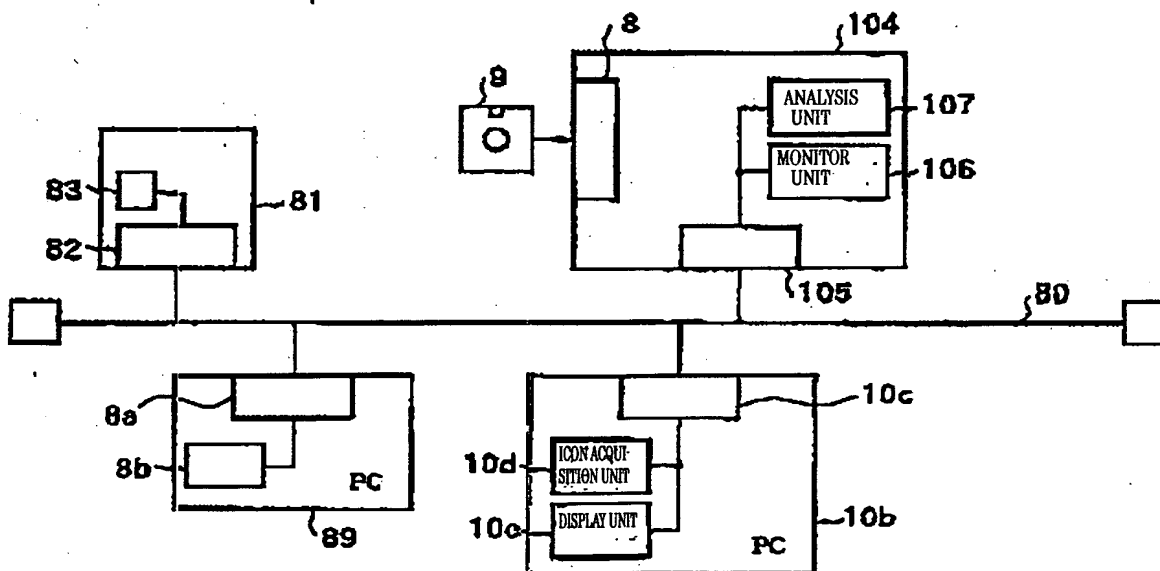


Fig.18

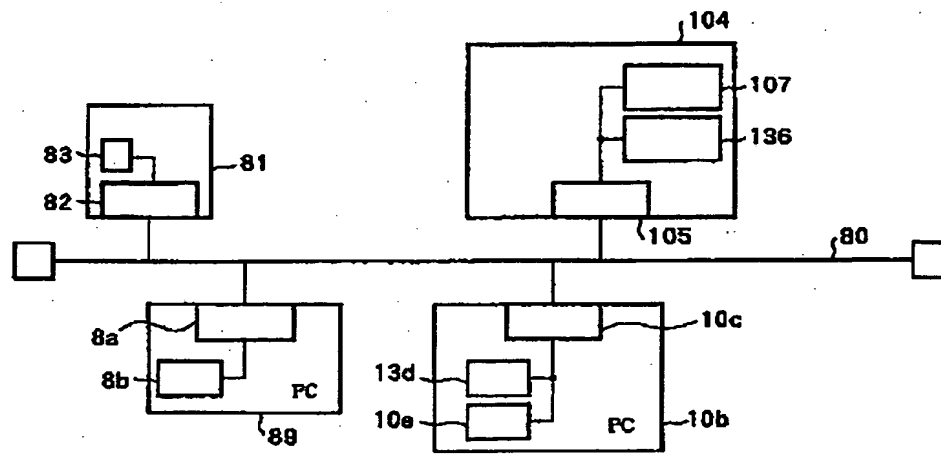


Fig.19

